THE GENERA OF THEACEAE OF THE SOUTHEASTERN UNITED STATES [1]

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THEACEAE (CAMELLIA FAMILY)

Shrubs or trees with simple, alternate, exstipulate leaves. Flowers complete, showy, borne singly in the axils of the leaves. Sepals 5(6), imbricate (quincuncial: 2 outside, 2 inside, 1 in-and-out), the calyx with 1–4 often caducous bracteoles. Petals 5(6–8), white, imbricate, the outermost usually smallest and somewhat cupped, united at the base. Stamens numerous, adnate to the petals. Gynoecium of 5 partly or wholly united carpels, the ovary superior, the locules 5; ovules 4–10 per locule, the placentation axile. Fruit a dehiscent capsule. (Ternstroemiaceae.) TYPE GENUS: *Thea* L. = *Camellia* L.

About 500 species in some 30 genera, primarily in the tropics of both hemispheres. Represented with us by four distinct species in three genera of the tribe CAMELIEAE DC. Generic and specific distinctions are often difficult in the family and the number of species and genera may be considerably fewer than indicated. The family as a whole is characterized by an abundance of sclereids, often of considerable size, in nearly all organs. Anatomical features have been used in conjunction with morphological characteristics in the separation and alignment of genera, but in most instances far too few representatives have been examined to warrant the weight sometimes given this evidence. Representatives of the exotic genera *Camellia* (including *Thea*), *Eurya* Thunb., *Cleyera* Thunb., and *Ternstroemia* L. f. are in cultivation in our area. Except for *Camellia* ($2n$ = 30, 45, 60, 90), little is known of chromosomes, embryology, or genetics. The family is notable for extreme endemism, on the one hand, and polymorphic, often ill-defined species, on the other.

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KEY TO THE GENERA OF THEACEAE

A. Seeds with a pronounced oblong wing at the upper end; capsule ovoid, loculicidally dehiscent, with a persistent central axis; sepals suborbicular, persistent at least into young fruit; foliage coriaceous, evergreen; bases of stamen-filaments united to form conspicuous fleshy pads. . . . . 1. *Gordonia*.

A. Seeds wingless or with only a narrow membranaceous margin; foliage membranaceous, deciduous; bases of filaments not united to form conspicuous pads.

B. Capsule globose, dehiscing loculicidally from above and septicidally from below, with a persistent central axis; sepals suborbicular, dehiscent at or soon after anthesis; capsule maturing a year after flowering. 2. *Franklinia*.

B. Capsule dehiscing loculicidally from above only, a central axis absent; sepals ovate to oblong-ovate, persistent into fruit; capsule maturing within a single season. . . . . 3. *Stewartia*.

1. **Gordonia** Ellis, Roy. Soc. London Phil. Trans. **60**: 520. *pl. 11*. 1771, nom. cons.

Shrub or tree to about 25 m. tall and 50(–65) cm. in diameter, with persistent, glabrous, lanceolate to oblong-lanceolate to elliptic leaves. Flow-

ers long-peduncled, with 4 bracteoles below the calyx deciduous before anthesis. Sepals 5, deciduous in late fruit. Both sepals and petals silky-pubescent on the outer surface. Stamens in 5 groups coherent at the bases to form 5 thick, fleshy pads adnate to the base of the corolla and coherent with each other to form a deeply 5-lobed ring. Ovary ovoid, pubescent, gradually contracted into a stout, persistent style, 5-loculed, the ovules 4–8 in each locule, the style elongate, erect, the stigma 5-lobed. Capsule subligneous, ovoid, acute at the apex, 1.5–2 cm. long, dehiscing loculicidally, with a persistent, angled central axis. Seeds compressed, the woody testa prolonged upwards into an oblong wing. (*Lasianthus* Adans. 1763, nom. rejic.) TYPE SPECIES: *G. Lasianthus* (L.) Ellis. (The name in honor of James Gordon, 1728–1791, a nurseryman at Mile-End, near London, "to whom the science of botany is highly indebted, and whose merit is universally known for his great knowledge in the cultivation of exotic plants.") — LOBLOLLY BAY, BAY, BLACK LAUREL, HOLLY BAY, SWAMP LAUREL, TAN BAY.

Primarily a genus of tropical and subtropical Asia, with about 30 species, all evergreen. Represented with us only by *G. Lasianthus*, a well marked species which occurs on the Coastal Plain from eastern North Carolina, south to the region of Lake Okeechobee, Florida, and west along the Gulf of Mexico to Mississippi, always in acid, peaty soils of nonalluvial branch- and creek-swamps, pocosins, hammocks, bays, sand-hill bogs, etc. Flowering from July and August, the plant is a handsome tree, sometimes cultivated. It is hardy as far north as Philadelphia. The bark and wood are rich in tannin; the wood is close-grained and easily worked but is not very durable. In late summer the younger leaves are almost characteristically insect-chewed.

The Asiatic species of the genus, with bracteoles varying from two to many and with a gradual transition of sepals into petals, are sometimes segregated as *Polyspora* Sweet ex G. Don. The Old and New World plants seem to differ in various anatomical aspects, but very few of the Old World species have been studied. Our species clearly seems to be closely related to the Old World Gordonias and to represent a survivor of once more widely dispersed types. Fossil Gordonias are reported from Europe and the western United States.

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2. **Franklinia** Marshall, Arbustrum Americanum 48. 1785.

Shrub or tree to about 10 m. tall, with membranaceous, deciduous

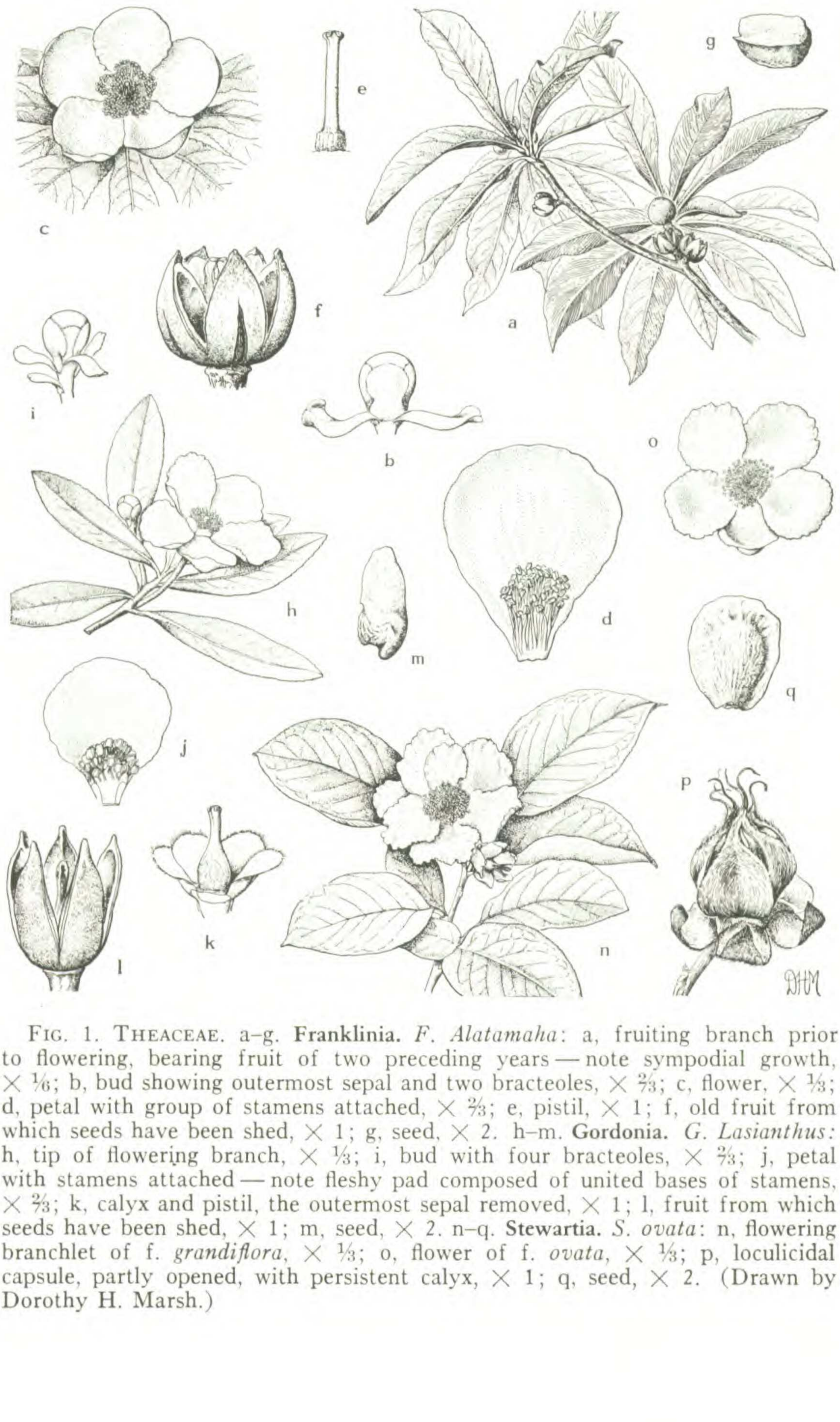

FIG. 1. THEACEAE. a–g. **Franklinia.** *F. Alatamaha*: a, fruiting branch prior to flowering, bearing fruit of two preceding years — note sympodial growth, × 1/6; b, bud showing outermost sepal and two bracteoles, × 2/3; c, flower, × 1/3; d, petal with group of stamens attached, × 2/3; e, pistil, × 1; f, old fruit from which seeds have been shed, × 1; g, seed, × 2. h–m. **Gordonia.** *G. Lasianthus:* h, tip of flowering branch, × 1/3; i, bud with four bracteoles, × 2/3; j, petal with stamens attached — note fleshy pad composed of united bases of stamens, × 2/3; k, calyx and pistil, the outermost sepal removed, × 1; l, fruit from which seeds have been shed, × 1; m, seed, × 2. n–q. **Stewartia.** *S. ovata*: n, flowering branchlet of f. *grandiflora*, × 1/3; o, flower of f. *ovata*, × 1/3; p, loculicidal capsule, partly opened, with persistent calyx, × 1; q, seed, × 2. (Drawn by Dorothy H. Marsh.)

oblong-lanceolate to oblanceolate leaves, tapering to the base. Flowers in the axils of crowded upper leaves, the buds with 2 quickly deciduous bracteoles below the calyx. Sepals 5, suborbicular, imbricate, coriaceous, deciduous at or soon after anthesis. Petals 5, up to 6 cm. long. Stamens in 5 distinct groups, the filaments free, adnate to the base of the corolla. Ovary rounded, truncate at the apex, densely pubescent, the sides conspicuously ridged by the pressure of stamen filaments, 5-loculed; style elongate, deciduous, the stigma 5-lobed. Capsule subglobose, woody, with a persistent central axis, dehiscing loculicidally from above to the middle, septicidally from below to the middle. Seeds 6–10 in each locule, closely packed in two rows, angular, the shape varying with the position within the locule, wingless. (*Lacathea* Salisb.) TYPE SPECIES: *F. Alatamaha* Marshall. (Named for Benjamin Franklin, American philosopher and statesman, 1706–1790.) — FRANKLINIA, FRANKLIN-TREE, LOST CAMELLIA.

A single species, *F. Alatamaha*, now known only in cultivation and formerly known only from an area of two or three acres of "sand-hill bog" or "branch-swamp" at the edge of sand hills about two miles from Fort Barrington, on the Altamaha (Alatamaha) River, in McIntosh County, Georgia, where it was first seen by John Bartram and his son, William, on October 1, 1765. The species was last seen at this spot by Moses Marshall, a nephew of Humphry Marshall, in 1790. It has not been found again in the wild in spite of repeated searches dating from about 1881. *Franklinia* has been cultivated in England since about 1774, however, and it is known that in 1777 William Bartram collected at Fort Barrington ripe seeds from which were grown plants which flowered in four years at Philadelphia. Most of the plants now in cultivation in the United States are thought to be descendants of a plant rescued by the Meehans of Philadelphia from Bartram's then-neglected garden some years before it was taken over by the city of Philadelphia. Attempts on the part of Humphry and Moses Marshall to fill large orders for *Franklinia* plants placed by a London firm in 1787 and 1789 may well have played a fatal part in the extinction of the colony at Fort Barrington.

The probable associates of *Franklinia* at the type locality include *Pinckneya, Pinus serotina* Michx. f., *Magnolia virginiana* L., *Cliftonia, Persea, Liriodendron, Lyonia lucida* (Lam.) K. Koch, *Smilax laurifolia* L., and *Sphagnum*, with *Rhododendron* (*Azalea*), *Leucothoë, Serenoa, Kalmia hirsuta* Walt., and *Styrax americana* L. var. *pulverulenta* (Michx.) Rehd. between bog and sand hill. (See Harper and Leeds.) The plant should be looked for carefully in similar areas both up and down river from Fort Barrington and in the neighboring Altamaha Grit region. It is not a plant of river-swamps but of acid, nonalluvial bogs at the heads of sand-hill branches (about 20 feet above sea level at the Fort Barrington locality).

As a cultivated plant the handsome flowers are usually produced from July (or, in the North, from late August or September) until frost. According to Bartram, however, at Fort Barrington the plant flowered from "April untill the autumn when it ceases flowering, whilst the seed of the flowers

of the preceding year are ripening," and at Thomasville, Georgia, it is reported to flower in April and May. Wherry suggests that the plant is nearly self-sterile and that seeds from self-pollinated plants do not germinate. Seedlings have been grown from plants in cultivation, however, and this matter needs to be checked. In spite of its extreme endemism on the coastal plain of Georgia, the plant is hardy as far north as Boston, flourishing in acid soils which are a prerequisite to its cultivation.

Although known for many years as *Gordonia pubescens*, and later as *Gordonia "altamaha," Franklinia* is distinct from all members of *Gordonia* in fruit shape and unique dehiscence, wingless seeds, and membranous and deciduous leaves. It differs further from *G. Lasianthus* in the deciduous calyx with two (instead of four) bracteoles, the sessile flowers, the free filaments, and the full year necessary for the maturation of the fruit.

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3. **Stewartia** L. Sp. Pl. **2:** 698. 1753; Gen. Pl. ed. 5. 311. 1754.

Shrubs or small trees with membranaceous, serrulate leaves. Flowers with 1 or 2 bracteoles below the calyx. Sepals 5(6), somewhat unequal, persistent. Petals 5(6–8), obovate to rounded, crenulate, silky pubescent on the outer surface. Stamens numerous, the filaments united at their bases to form a shallow ring adnate to the base of the corolla. Styles 5, distinct, or united and stigmas 5. Capsule globose to ovoid, loculicidally dehiscent, lacking a central columella, woody, pubescent. Seeds compressed, 1–4, attached near the base of each locule, obovate-lenticular, the testa thick and crustaceous, with or without a thinner margin. (*Stuartia* L'Hér.; including *Malachodendron* Cav.) TYPE SPECIES: *S. Malacodendron* L. (The name in honor of John Stuart, 1713–1791, third Earl of Bute, who was distinguished in his day as a botanist.) — STEWARTIA.

A genus of about six species of eastern Asia and the southeastern United States, represented with us by two very distinct species. *Stewartia ovata* (Cav.) Weatherby (*S. pentagyna* L'Hér.), with five styles and dull, reddish-brown seeds with a narrow, thin margin, is primarily a plant of the

southern Appalachians in southeastern Kentucky, eastern Tennessee, western North Carolina, northern Georgia, and to central Alabama. *Stewartia Malacodendron* L., with united styles and lustrous, angled seeds lacking an evident margin, ranges more widely, primarily on the Coastal Plain and in the Piedmont (with but a few mountain stations) from Virginia to Louisiana, and with a station in Ouachita County, Arkansas. Both species, although very distinct, are obviously closely related to each other and to the Asiatic species, so much so that the genus *Malachodendron* (*S. ovata*) can be regarded only as a purely artificial segregate. Like *S. Malacodendron*, all of the Asiatic species have united styles.

Both are showy plants, worthy of more widespread cultivation. *Stewartia Malacodendron* flowered in Catesby's garden in England in 1742, and *S. ovata* has been cultivated since about 1785. The latter is the hardier plant, withstanding the winters of eastern Massachusetts. An acid soil is necessary. Propagation is by seeds or softwood cuttings. *Stewartia ovata* f. *grandiflora* (Bean) Kobuski [2] is a handsome plant, often with more than five petals and with purple, instead of white, stamen-filaments. It occurs with the white-filamented form, f. *ovata*, in some localities. The filaments of *S. Malacodendron* are purple.

Anatomically, the genus is interesting in that those species thus far examined lack sclereids (except in the pedicels), in contrast to other members of the family.

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[2] **Stewartia ovata** (Cav.) Weatherby, forma **grandiflora** (Bean) Kobuski, comb. nov. *S. pentagyna* L'Hér. var. *grandiflora* Bean, Trees & Shrubs Brit. Isles **2:** 555. 1914. *S. ovata* var. *grandiflora* (Bean) Weatherby, Rhodora **41:** 198. 1939. *Malachodendron pentagynum grandiflorum* E. J. Alexander, Addisonia **19:** 1. *pl. 609.* 1935. Since the form of *Stewartia ovata* with purple filaments is well known in horticulture, it seems worth while to have a nomenclatural combination more nearly indicative of its taxonomic status which, it now appears, is not that of a geographical varietas. Both this and the typical form may occur together, and there appears to be no geographical segregation. In addition, one plant in the living collections of the Arnold Arboretum (No. 18244-B, from T. G. Harbison, Highlands, N. C., in 1925) behaves in much the same way as some of the mutable forms of *Camellia japonica*, producing 5-petaled flowers with either purple or nearly white filaments, or occasionally chimeric flowers with both. Another, more vigorous plant (18244-A) of the same collection produces only flowers with purple filaments and with 5–7 petals. (See *Fig. 1, n*, drawn from the latter plant.) — C. E. KOBUSKI.